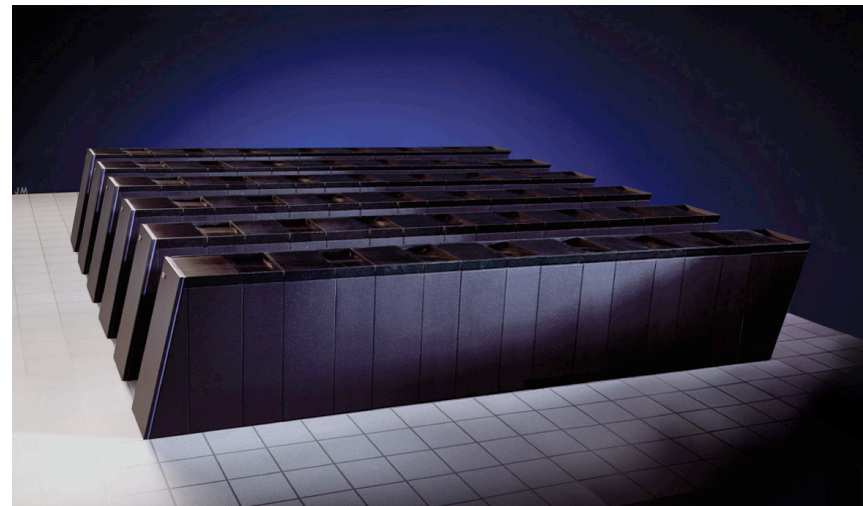


Argonne Leadership Computing Facility

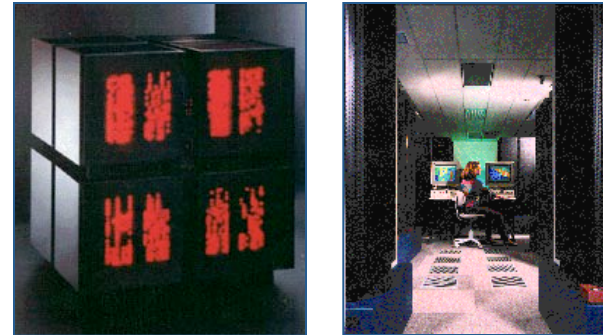
Overview



Pete Beckman, Director
Argonne Leadership Computing Facility

Over 20 years of Advanced Systems for DOE and Others

- **ACRF** period [1983-1992]
 - DOE's founding ACRF
 - Explored many parallel architectures, developed programming models and tools, trained >1000 people
- **HPCRC** period [1992-1999]
 - Production-oriented parallel computing for Grand Challenges in addition to Computer Science.
 - Fielded 1st IBM SP in DOE



- **TeraGrid** [2001-present]
 - Overall Project Lead
 - Defining, deploying and operating the integrated national cyberinfrastructure for NSF
 - 9 sites, 22 systems, 200TF
- **LCRC** [2003-present]
 - Lab-wide production supercomputer service
 - All research divisions, 56 projects, 380 users
- **BlueGene Evaluation** [2005-present]
 - Founded BlueGene Consortium with IBM
 - 67 institutions, >260 members
 - Applications Workshop Series
 - Systems Software Collaborations

ALCF Timeline

2004

- Formed of the Blue Gene Consortium with IBM
- DOE-SC selected the ORNL, ANL and PNNL teams for Leadership Computing Facility award

2005

- Installed 5 teraflops Blue Gene/L for evaluation

2006

- Began production support of 6 INCITE projects, with BGW
- Joined IBM and LLNL to design and develop next Blue Genes
- “Lehman” Peer Review of ALCF campaign plans

2007

- Increased to 9 INCITE projects; continued development projects
- Install 100 teraflops Blue Gene/P system

2008

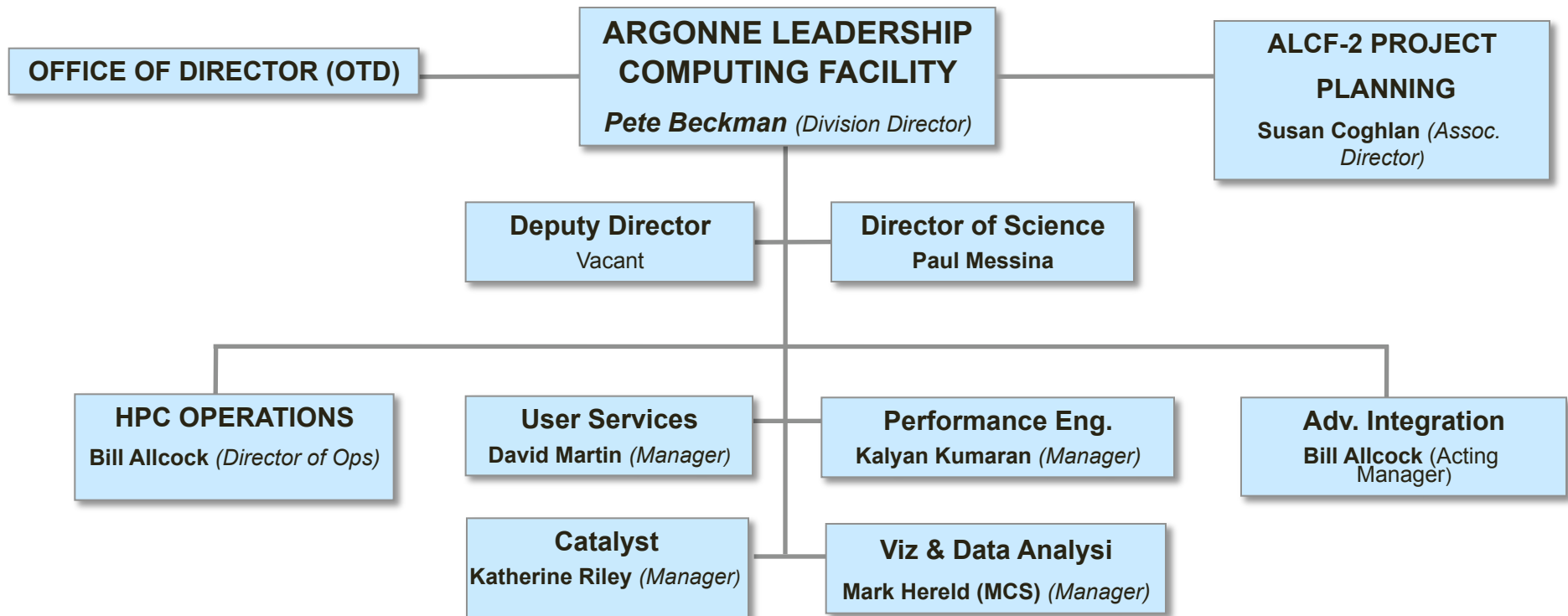
- Began support of 20 INCITE projects on Blue Gene/P
- Add 500T teraflops Blue Gene/P system

2009

- Went production on 557 teraflops Blue Gene/P system
- Began support of 28 INCITE projects
- Approved for 10 petaflop system to be delivered in 2012 timeframe
- Began joint Argonne/NERSC *Magellan* cloud project
- Delivered 897M core hours to science

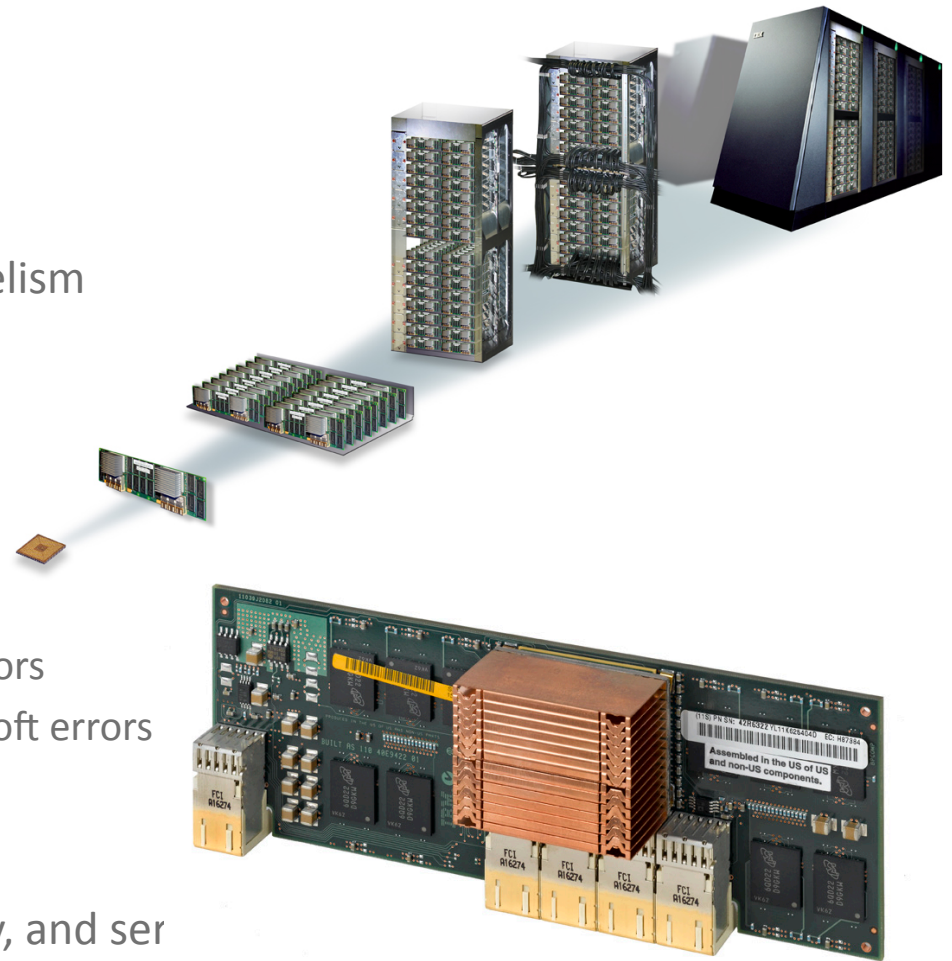


ALCF Organization Chart



Blue Gene DNA

- Low power design → massive parallelism
 - The leader in Green Computing
- System on a Chip (SoC)
 - Improves Price / Performance
 - Reduces system complexity & power
- Custom designed ASIC
 - Reducing overall part count, reducing errors
 - Permits tweaking CPU design to reduce soft errors
- Dense packaging
- Fast communication network(s)
- Sophisticated RAS (reliability, availability, and ser
- Dynamic software provisioning and configuration

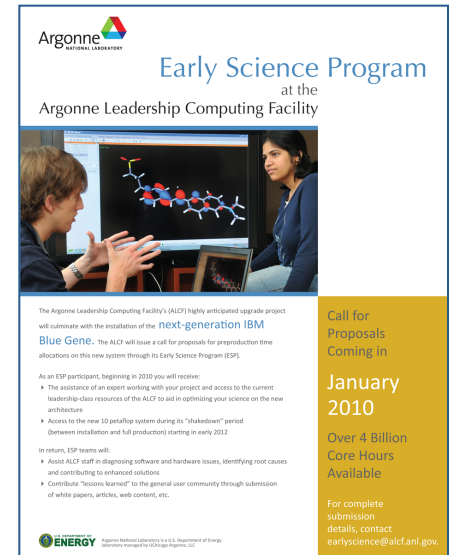


Argonne Theory and Computing Sciences Building



Early Science

- The Argonne Leadership Computing Facility's (ALCF) highly anticipated upgrade project will culminate with the installation of the next-generation IBM Blue Gene. The ALCF will issue a call for proposals for preproduction allocations on this new system through its Early Science Program (ESP).
- As an ESP participant, beginning in 2010 you will receive:
 - The assistance of an expert working with your project and access to the current leadership-class resources of the ALCF to aid in optimizing your science on the new architecture
 - Access to the new 10 petaflop system during its “shakedown” period (between installation and full production) starting in early 2012
- In return, ESP teams will:
 - Assist ALCF staff in diagnosing software and hardware issues, identifying root causes and contributing to enhanced solutions
 - Contribute “lessons learned” to the general user community through submission of white papers, articles, web content, etc.



The poster for the Early Science Program at the Argonne Leadership Computing Facility. It features the Argonne National Laboratory logo at the top left. The title "Early Science Program at the Argonne Leadership Computing Facility" is prominently displayed. Below the title is a photograph of two researchers, a man and a woman, looking at a computer screen showing a molecular model. The text on the poster describes the program's purpose: to assist with the installation of the next-generation IBM Blue Gene system. It lists the benefits for ESP participants, including expert assistance and access to the new 10 petaflop system during its "shakedown" period. It also outlines the responsibilities of ESP teams, such as assisting ALCF staff and contributing to the user community. The poster includes a call for proposals coming in January 2010, with over 4 billion core hours available. For complete submission details, it provides the email address earlyscience@alcf.anl.gov. The bottom of the poster features the U.S. Department of Energy logo and the text "Argonne National Laboratory is a U.S. Department of Energy Laboratory managed by Argonne Global, LLC."

Argonne NATIONAL LABORATORY

Early Science Program
at the
Argonne Leadership Computing Facility

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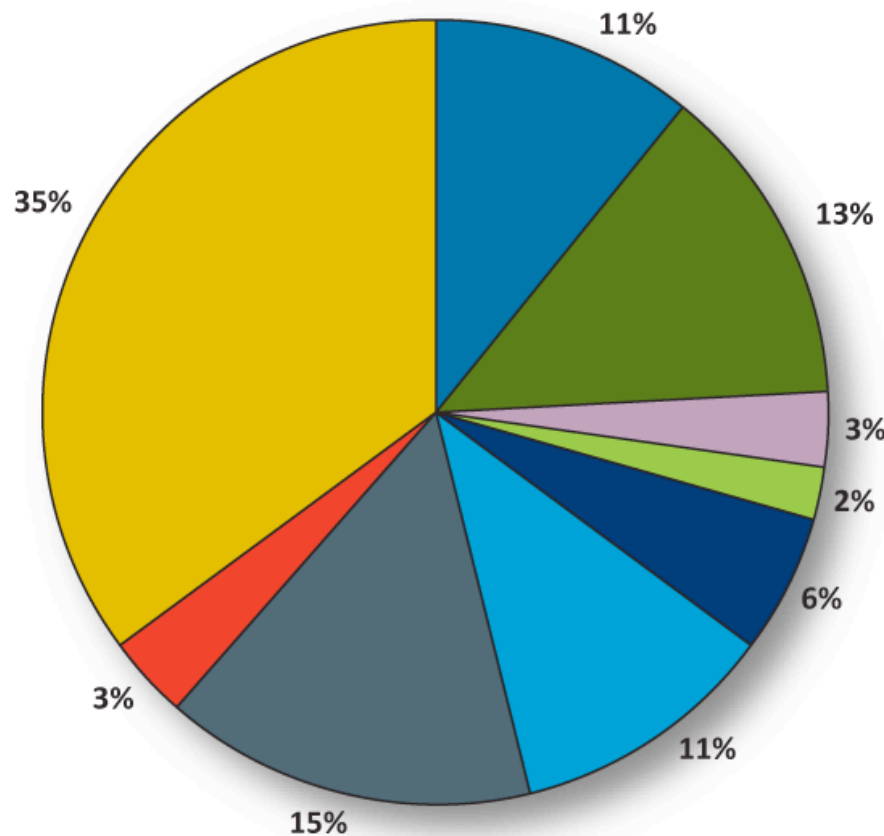
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Over 4 Billion Core Hours Available

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U.S. DEPARTMENT OF ENERGY Argonne National Laboratory is a U.S. Department of Energy Laboratory managed by Argonne Global, LLC.

2010 INCITE Allocations by Discipline



Total Argonne Hours = 646,000,000

